

Supporting Information:

Novel compounds targeting neuropilin receptor 1 with potential to interfere with SARS-CoV-2 virus entry

Samantha Perez-Miller^{1,2,†}, Marcel Patek^{3,†}, Aubin Moutal¹, Paz Duran de Haro¹, Carly R. Cabel^{4,5}, Curtis A. Thorne^{4,5,6}, Samuel K. Campos^{5,6,7}, and Rajesh Khanna^{1,2,8*}

¹Department of Pharmacology, College of Medicine, The University of Arizona, Tucson, AZ, United States; ²The Center for Innovation in Brain Sciences, The University of Arizona Health Sciences, Tucson, Arizona, USA; ³Bright Rock Path Consulting, LLC, Tucson, Arizona; ⁴Department of Cellular & Molecular Medicine, College of Medicine, The University of Arizona; ⁵Cancer Biology Graduate Interdisciplinary Program, University of Arizona, ⁶Bio5 Institute, University of Arizona, ⁷Department of Immunobiology, College of Medicine, University of Arizona; and ⁸Regulonix LLC, Tucson, AZ, USA.

[†]Contributed equally to this work

*To whom correspondence should be addressed: Dr. Rajesh Khanna, Department of Pharmacology, College of Medicine, University of Arizona, 1501 North Campbell Drive, P.O. Box 245050, Tucson, AZ 85724, USA Office phone: (520) 626-4281; Fax: (520) 626-2204; Email: rkhanna@arizona.edu

Supplementary Table 1. Physico-chemical properties and structures of top 100 hits, arranged by docking score.

Cmpd	SMILES	Glide_gscore	Set	Mw	clogP	HB-D	HB-A	Lipinski	NHOH	RotB	TPSA
V51	COc1cccc(-c2cc(=O)[nH]c(N3cccc3)n2)c1	-12.1	DIV	293.3	3.2	2	4	Yes	2	4	67
V52	CC(C)C1cc(C(=O)NCC2COC2)nc(=O)[nH]1	-11.5	DIV	279.3	0.7	2	4	Yes	2	5	84
V53	O=C(O)CNc1nc2[nH]c2c(=O)[nH]1	-11.3	NP	209.2	-0.9	4	5	Yes	4	3	124
V54	O=C(O)C1cnc(-c2ccnc2)n1c1=O	-11	NP	231.2	0.5	2	4	Yes	2	3	96
V55	O=C1C(O)C(C2cccc2)N1	-11	NP	191.2	0.5	2	2	Yes	2	2	49
V56	COC(=O)N1CCN2C(=O)C(C3ccc(O)cc3)NC(=O)C2C1	-10.9	NP	347.4	-0.9	2	5	Yes	2	4	99
V57	CC(C)C1cc(C(=O)N2CCN1c3nccc3)C2)nc(=O)[nH]1	-10.8	DIV	342.4	0.7	1	6	Yes	1	4	95
V58	O=C(O)C1c1ccc(O)c(O)c1)CC(C1ccc(O)c(O)c1)C(=O)O	-10.7	NP	358.3	2.4	5	6	Yes	5	7	135
V59	O=C(O)C1c1ccc(O)c(O)c1)CC(C1ccc(O)c(O)c1)C(=O)O	-10.7	NP	358.3	2.4	5	6	Yes	5	7	135
V510	CC(C)C1ncc(C(=O)O)c(=O)[nH]1	-10.7	NP	196.2	0.5	2	3	Yes	2	3	83
V511	CC(N+)(C)(O)CC1C(=O)OC2C(CCC4(O)C42)C(C)CCC13	-10.6	NP	322.5	2.6	0	3	Yes	0	3	39
V512	O=c1[n-]c1(Br)n2[nH]c1[nH+]c12	-10.5	NP	215	-0.5	1	2	Yes	2	0	74
V513	[C\$-](CCON)CC1OC(n2nc3c(N)ncn32)C(O)C1O	-10.5	NP	357.4	-1.8	4	10	Yes	6	6	155
V514	CC(C)C1cc(C(=O)N)C(C2ccc3nnc32)nc(=O)[nH]1	-10.4	DIV	357.4	2.2	1	6	Yes	1	5	92
V515	Cc1nc(N2COC2)nc1-c1cc(=O)[nH]c(Nc2cccc2)n1	-10.4	DIV	364.4	2.1	2	7	Yes	2	4	96
V516	COc1cccc1Nc1nc(-c2cnc(N3CCCC3)n2)cc(=O)[nH]1	-10.4	DIV	378.4	2.9	2	7	Yes	2	5	96
V517	C[N+](C)(C)C1CCCC(=O)C1	-10.3	NP	170.3	1.6	0	1	Yes	0	1	17
V518	CC(C)C1cc(C(=O)N)C(C)C(C2cnc2)nc(=O)[nH]1	-10.3	DIV	329.4	1.5	1	5	Yes	1	6	92
V519	CC(C)C1cc(C(=O)N)C2ccc3c(2)C(CCO3)nc(=O)[nH]1	-10.3	DIV	341.4	2.2	2	4	Yes	2	5	84
V520	CC1CCC2C(C[N+](C)(C)C(C)C(=O)OC23)CCC1(C)OC13	-10.3	NP	308.4	2.2	0	3	Yes	0	2	39
V521	CC(C)C1cc(C(=O)O)cc(=O)[nH]1	-10.2	NP	195.2	1.3	2	2	Yes	2	3	70
V522	O=c1[n-]cnc2c1[nH+]cn2C1O(CO)C(O)C1O	-10.2	NP	268.2	-3.2	3	7	Yes	4	2	133
V523	CC(O)C(O)C1Cnc2nc[nH]c(=O)c2N1	-10.2	NP	226.2	-1.3	5	6	Yes	5	2	110
V524	C[N+](C)(C)CC1(C(=O)O)CC(O)C(O)N1	-10.1	NP	217.2	-0.8	3	3	Yes	3	3	90
V525	Cc1ccc(C(=O)N2CCCCc3nnc(C)[nH]3)C2)cc(=O)[nH]1	-10.1	DIV	301.4	1.1	2	4	Yes	2	2	95
V526	C[N+](C)(C)CC1(C(=O)O)C1=O	-10.1	NP	202.2	-0.3	2	2	Yes	2	4	75
V527	O=C(O)C(O)C=C1ccc(O)c(O)c1=C1C1ccc(O)c(O)c1	-10	NP	328.3	2.8	5	5	Yes	5	5	118
V528	CCc1ccc(C(=O)N)CC(C)C2ccc2cc(=O)[nH]1	-10	DIV	315.4	1.6	1	4	Yes	1	7	75
V529	O=C(O)C(C)C1cccc1)NCC1(O)OC(CO)C(O)C1O	-9.9	NP	327.3	-1.9	6	7	No_HBD	6	7	139
V530	O=C(CCOc1cccc1)NC1CC(=O)N(C2ccc(F)2)C1	-9.9	DIV	356.4	2.5	1	3	Yes	1	7	59
V531	CC(O)(C(=O)O)C(O)COC(=O)C=C1ccc(O)c(O)c1	-9.8	NP	312.3	-0.1	5	7	Yes	5	6	145
V532	COc1cc2cc1c1C(=O)OC21C(C)C(=O)O1	-9.8	NP	276.3	2.3	0	5	Yes	0	1	62
V533	CC(C)C1cc(C(=O)N)C2CCC(O)C3cccc3)C2)nc(=O)[nH]1	-9.8	DIV	370.5	2.2	1	5	Yes	1	6	88
V534	O=C1CCC(C2cccc2)N1	-9.8	NP	175.2	1.5	1	1	Yes	1	2	29
V535	COc1cccc1Nc1nccc(=O)[nH]1	-9.8	DIV	218.2	0.9	2	5	Yes	2	3	80
V536	CCCCC1(O)NC(=O)C2OC21	-9.7	NP	171.2	-0.2	2	3	Yes	2	3	62
V537	CC1=C(C)COC2OC(CO)C(O)C2O)C(C)C(C)C(=O)O)CC1	-9.7	NP	362.4	-1.8	6	8	No_HBD	6	7	157
V538	O=c1cnc(Nc2cccc2O)[nH]1	-9.7	DIV	204.2	0.6	3	5	Yes	3	2	91
V539	CCc1ccc(O)N(C)C2ccc(O)C3cccc23)cc(=O)[nH]1	-9.6	DIV	351.4	2.8	1	4	Yes	1	5	75
V540	CC1c(C(=O)N)CC2ccc(O)c2)C(=O)O)C(=O)OC2ccc3ccc(C(C)C(C)C)3cc12	-9.6	NP	477.5	4.2	3	6	Yes	3	6	130
V541	O=C1OC2ccc(O)c(O)c2)C(CO)C1=C1c1ccc(O)c(O)c1	-9.6	NP	344.3	1.8	5	7	Yes	5	3	127
V542	ON1CC(CO)CC(c2ccc(-O)[nH]2)C1	-9.6	NP	222.3	0.4	2	3	Yes	2	2	56
V543	CC1cccc1Nc1nccc(=O)[nH]1	-9.6	DIV	216.2	1.5	2	4	Yes	2	3	71
V544	[Cn-]1cnc(C2OC(CO)C(O)C2O)c2[nH]c(-O)c21	-9.6	NP	299.3	-3.5	5	7	Yes	5	2	144
V545	NC(=O)CC(NC(=O)C)C1cccc1)NC(=O)N1CC(=O)Nc2cccc21)C(=O)O	-9.6	NP	453.0	0.2	5	5	Yes	6	8	171
V546	CCc1ccc(C(=O)N)C2CC3nc(-c4cccc(O)c4)[nH]c3C2)cc(=O)[nH]1	-9.6	DIV	378.4	2.5	2	4	Yes	2	4	91
V547	[Cn-]1c[nH]c2c(COC(CO)C(O)C3O)nc-2c1N	-9.6	NP	282.3	2.5	5	7	Yes	6	2	141
V548	CCCC/C=C/C(C)C(O)OC1=O	-9.6	NP	196.2	1.9	1	3	Yes	1	4	47
V549	O=C(C)CN1CC(c2cccc2)CC1=O)N1CCCN(C(=O)c2cccc2)CC1	-9.5	DIV	395.5	2	0	4	Yes	0	4	74
V550	NC(CCN)1cccc(C(=O)O)c1(C)C(=O)O	-9.5	NP	225.2	-0.5	3	3	Yes	4	5	105
V551	O=C(O)C1cc(=O)[nH]c(-O)[nH]1	-9.5	NP	170.1	-1.3	3	3	Yes	3	2	103
V552	O=C1N(Cc2cccc2)C2C3+3CCCC2GN1C1cccc1	-9.5	NP	365.5	3.7	0	1	Yes	0	4	24
V553	O=C(Cc1ccc(O)c(O)c1)O)C1cccc(O)c1O	-9.5	NP	290.3	2	4	6	Yes	4	4	107
V554	Cc1ccc2ccc3cc(=O)C(=O)NC(C4c[nH]c5cccc45)C(=O)O)C(C)3cc12	-9.4	NP	458.4	4	3	5	Yes	3	6	126
V555	O=C(O)C1c1ccc(O)c(O)c1)OC(C(=O)O)C(O)C(=O)O	-9.4	NP	312.2	-0.4	5	7	Yes	5	6	162
V556	Cc1c(C)[n-]([O-])cn1C(CCC(=O)O)C(=O)O	-9.4	NP	242.2	0.2	2	4	Yes	2	5	106
V557	CC(C)C1cc(C(=O)N)C2CC3cccc3C2)nc(=O)[nH]1	-9.4	DIV	317.4	2.2	1	4	Yes	1	3	66
V558	O=C1N(C)C(F)F)F)C2(CCC2)N1	-9.4	NP	206.2	1.7	2	1	Yes	2	0	41
V559	O=C(O)CNc1nc2[nH]cnc2c(=O)[nH]1	-9.4	NP	209.2	-0.9	4	5	Yes	4	3	124
V560	O=P(O)(O)OC1OC(O)(OP(=O)(O)O)C(O)C1O	-9.4	NP	326.1	-2	7	8	No_HBD	7	5	203
V561	COc1cc(OC)c2c(C)C(C(=O)N)C(C3ccc(O)cc3)C(=O)O)C(=O)OC2c1	-9.4	NP	441.4	2.3	3	7	Yes	3	8	135
V562	CCc1ccc(C(=O)N)C2CC(C2)cc(=O)[nH]1	-9.4	DIV	246.3	1.7	1	2	Yes	1	3	53
V563	Cc1c(O)C(=O)C(COP(=O)(O)O)[nH]1O-}	-9.4	NP	263.1	-0.2	3	5	Yes	3	4	131
V564	O=C(O)C1ccc(=O)[nH]c(=O)[nH]1	-9.3	NP	156.1	-1.2	3	3	Yes	3	1	103
V565	CCc1ccc(C(=O)N)C2COC(C3ccc(F)3)C2)cc(=O)[nH]1	-9.3	DIV	330.4	2.3	1	3	Yes	1	3	62
V566	NC(C(=O)O)C1C(C)N(=O)[O-]O1	-9.3	NP	194.6	-0.8	2	4	Yes	3	2	99
V567	COCC1OC([n-]2nnc3c(N)[nH]cnc23)C(O)C1O	-9.3	NP	282.3	-2	4	7	Yes	5	3	130
V568	CC(C)CC(NC(=O)C)C(O)C1C=C(CD=O)O1)C1C2ccc(O)c2C(=O)O1	-9.3	NP	389.4	0.8	3	7	Yes	3	6	122
V569	Cc1ccc(=O)[nH]c(C)C1n1	-9.2	NP	152.2	1.2	1	2	Yes	1	1	46
V570	O=C(O)C1ccc([n-]2COC(CO)C(O)C2O)c1	-9.2	NP	256.2	-1.7	4	5	Yes	4	3	111
V571	C[N+](C)(C)CC1CCC(=O)O1	-9.2	NP	158.2	0.4	0	2	Yes	0	2	26
V572	CC(O)C(O)C1ONc2nc(N)[nH]c(-O)c2N1	-9.2	NP	239.2	-1.5	5	7	Yes	6	2	133
V573	O=C(O)C1c1ccc(O)c(O)c1)OC1C=C(C(=O)O)C3)cc12)OC(Cc1ccc(O)c(O)c1)C(=O)O	-9.2	NP	492.4	3.9	6	9	No_HBD	6	7	178
V574	O=C(O)C1CCC2(C=C(O)C(C2)C(=O)N1	-9.2	NP	209.2	-0.6	3	3	Yes	3	1	87
V575	O=C(O)C1ccc([n-]2COC(CO)C(O)C2O)c1	-9.2	NP	256.2	-1.7	4	5	Yes	4	3	111
V576	O=C(O)C1ccc(=O)[nH]c(-O)[nH]1	-9.2	NP	156.1	-1.2	3	3	Yes	3	1	103
V577	O=c1[nH]cnc2c1nnc2C1OC(COP(=O)(O)O)C(O)C1O	-9.2	NP	348.2	-2.2	5	9	Yes	5	4	180
V578	O=C(O)C1ccc(=O)[nH]c(-O)[nH]1	-9.2	NP	156.1	-1.2	3	3	Yes	3	1	103
V579	Cc1c(CCC(=O)N)C(Cc2ccc(O)c2)C(=O)O)C(=O)OC2cc(O)ccc12	-9.2	NP	411.4	2.3	4	6	Yes	4	7	137
V580	O=C1CCC(CN(C2cccc2)C2nc3cccc3c(=O)[nH]2)N1	-9.2	DIV	369.2	1.7	2	6	Yes	2	6	91
V581	O=C(O)CC(Cc1cccc1)OC1OC(CO)C(O)C1O	-9.2	NP	356.4	-0.7	5	7	Yes	5	8	137
V582	NC(=O)CC(NC(=O)C)C1cccc1)NC(=O)N1CC(=O)Nc2cccc21)C(=O)O	-9.2	NP	467.5	0.6	5	5	Yes	6	9	171
V583	COC1=C2C=C2(C2CC(C)C(O)C2=O)COC1=O	-9.2	NP	262.3	2	0	4	Yes	0	2	53
V584	O=C(O)C1c1ccc(O)c(O)c1)OC1C=C(C(=O)O)OC(C(=O)O)C1O	-9.2	NP	366.3	-0.2	5	8	Yes	5	5	171
V585	CC(C)C(CO)NC(=O)CC1NC(=O)N(Cc2ccc3c(2)OC3)C1=O	-9.2	NP	391.4	0.7	3	6	Yes	3	8	117
V586	CC1cc(ON(C)C2ccc(=O)[nH]c(-O)[nH]2)no1	-9.2	DIV	250.3	0	2	5	Yes	2	4	95
V587	CC(=O)C(Cc1ccc(O)c(O)c1)OC1=C(O)C=C1c1ccc(O)c(O)c1	-9.1	NP	374.3	1.8	4	8	Yes	4	6	134
V588	CO(=O)NC1C(O)C2ccc(C)cc2)OC(CO)C(O)C1O	-9.1	NP	325.4	-0.4	4	6	Yes	4	4	108
V589	CCC(=O)NC(C(=O)O)C(N+)(C)C(C)C	-9.1	NP	217.3	0.1	2	2	Yes	2	6	66
V590	COc1ccc2c(C)C(CCC(=O)N)C(CO)C3cccc3)cc(=O)OC2c1	-9.1	NP	381.4	2.4	2	5	Yes	2	7	89
V591	C[N+](C)(C)CC1(C(=O)O)CC(O)C(=O)N1	-9.1	NP	217.2	-1.6	3	3	Yes	3	3	87
V592	O=c1[n-]cnc2c1[nH+]cn2C1C=C(CO)C(O)C1O	-9.1	NP	264.2	-2.6	3	6	Yes	4	2	124
V593	CC(=O)OC(C(=O)O)C(N+)(C)C(C)C	-9.1	NP	204.2	0.1	1	3	Yes	1	5	64
V594	O=C(CN1CCCCC1=O)NC(CO)CC1cccc1	-9.1	DIV	318.4	1.5	2	3	Yes	2	7	70
V595	O=C(O)C(Nc1nc2[nH]cnc2c(=O)[nH]1	-9.1	NP	209.2	-0.9	4	5	Yes	4	3	124
V596											